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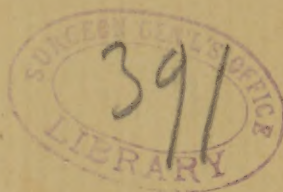
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PRACTICAL POINTS IN THE DIAGNOSIS  
AND TREATMENT OF

# MALARIA IN CHILDREN.

BY  
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NEW YORK.



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[Reprinted from the Archives of Pediatrics, January, 1890.]

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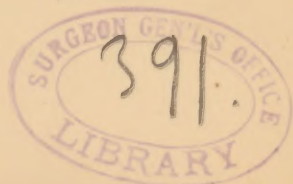


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THE vague expression, "a touch of malaria," is heard as often in the diagnosis of the diseases of children as it is in that of the diseases of adults. This diagnosis, which is at once popular and covers a multitude of physical sins in the lay mind, is resorted to by the physician, not so much from a desire to seek shelter under a mantle of ignorance, as it is because he is too lazy or too busy to examine the child thoroughly. In the present state of medical knowledge, in spite of recent strides, protection under a mantle of ignorance is not only excusable but at times unavoidable. We use the term "neurasthenia," and are glad to have it for a set or group of symptoms of the pathology or nature of which we are in utter ignorance; but with malaria, however, the case is entirely different. Here we have a distinct poison, definite pathological processes, and a set of symptoms which, although they may be variable, are, on the whole, tolerably uniform.

In my opinion, the vagueness in the diagnosis of malaria in early life has been, in a measure, propagated by the system of elevating a single symptom into pathognomonic value. One would diagnosticate the affection from a peculiar state of the tongue; another, from the color of the skin; and a third, from some peculiarity of an abdominal pain. It would, in my mind, be just as scientific to make the diagnosis of pneumonia from some peculiarity in the cough, without a thorough physical examination of the chest, as it would be to make the diagnosis of malaria without noting the condition of the spleen, because the patient presented a dark-brown tint of the skin, or had headache, or because the tongue was coated with a brownish-yellow fur. One often hears it said, "Well, what





does it matter about a correct diagnosis of malaria? If you suspect it, you give quinine and settle the point." But it *does* matter to the patient's welfare, and it *ought* to matter to the physician's self-respect, whether he treats disease with the best knowledge that is within him or at random by firing "shot doses" of medicine at it. Then, a few doses of quinine does not always cure malaria, while it may cure an entirely different affection. But of the value of quinine as a therapeutic test, later on.

It is my intention, therefore, in this article, to bring under review the most prominent and reliable symptoms of malarial poisoning as observed in early life, discuss each symptom separately, and thereby endeavor to estimate its value in forming a diagnosis of that affection. Afterwards the different diseases which may be mistaken for malaria will be discussed and an effort made to indicate their points of differentiation.

I have nothing particularly new or startling to offer. My object is merely to emphasize a few well-established facts that seem in danger of being consigned to oblivion, and to present some practical points that I have had to learn for myself, and the mention of which I only found, afterwards, scattered through a literature which, although not extensive, is not easily accessible. My remarks are based upon a careful study of eighty cases of malaria, in early life, that came under my observation in dispensary and private practice during the past eighteen months, and on a close perusal of the literature to which I have referred.

The prominent symptoms and signs of acute malaria are chills, convulsions, fever, sweating, enlargement of the spleen, hæmatozoa in the blood.

*Chills.*—In children the chills, as a rule, do not set in so abruptly as in the adult. There is usually a prodromal stage of a few days' duration characterized by malaise, a tired feeling, and lack of energy. The child does not play and run about as usual, and suffers from loss of appetite. In very early life—that is, under two years—chills are said never to occur, but I have observed distinct chills in one patient nineteen months old, and in another two years old. Instead of a chill, the mother, if observant, will usually notice that of a sudden the child grows drowsy, frequently yawns, and stretches

itself several times. The lips and finger-nails become blue, while the little hands feel cold to the touch. Frequently twitching of the eyelids will be observed, and this phenomenon may be a forerunner of a convulsive seizure. In older children chills occur as in the adult, although they are seldom so pronounced or of such long duration. Sometimes they are entirely absent. Some of my patients complained merely of a chilly sensation running down the spine; others, again, had never even complained of feeling cold. The period of the day at which the chills occur varies very considerably. In my cases the chills—in fully half the number—took place towards evening, between 2 and 8 o'clock P.M.; of Holt's one hundred and six cases, in thirty-five the chills occurred in the forenoon, and seventy-one in the evening; Bohn's statistics correspond to the foregoing. The chills in early life are irregular in their recurrence. The mother will often tell you that they began at first late in the afternoon, but that each subsequent attack occurred earlier, so that the latter ones have taken place in the morning, or the reverse may have been the case; they began in the forenoon and ended by recurring in the afternoon or evening. The most common type in children, according to some observers, is the quotidian. Of Bohn's four hundred and sixty-five cases, two hundred and forty-five were of this type.

Next in frequency is the tertian form, which comprised two-thirds of my cases. The difference in statistics by different authors depends upon the severity of the epidemic; the more severe exhibiting the quotidian, the less severe the tertian form. Other forms are rare.

Recurring chills are common to other diseases than malaria. They are witnessed in hectic fever, in ulcero-endocarditis, in pyæmia, and whenever suppuration is taking place in deep-seated parts. Hectic fever is most likely to be the attendant of some chronic process, such as phthisis of the lungs, which is not an uncommon disease in childhood. When we recall the fact that malarial chills may frequently occur in the evening, the period at which the chills of hectic fever usually recur, it may be readily conceived that an error could easily be committed, if too much dependence were placed upon this symp-



tom alone. The chills attending pyæmia and suppuration of the deeper parts seldom exhibit the same periodicity as those of malaria, nor the same freedom from febrile disturbance in the intervals. Further, the chills of pyæmia are often characterized by the profuse sweating which immediately follows them rather than by an active development of the fever. In the early stages of pyæmia, however, it will not always be easy to tell whether the chills are of pyæmic or malarial origin, particularly if the patient has not recently undergone an operation or the source of the pus is not evident. I retain a vivid recollection of a case that I saw in the Montreal General Hospital during my student career. A boy, æt. five years, was taken ill with recurring rigors, followed by fever and sweating. At first a diagnosis of malaria was made; but later on, as metastatic abscesses were observed in various parts of the body, the diagnosis was changed to pyæmia; but no suppurating lesion, as the source of the disease, could be detected. The hope of finding this, even at the autopsy, was almost given up when that most careful and acute observer, Dr. Wm. Osler, then of Montreal, began dissecting out every bone of the body, and finally found a small periosteal abscess of the tibia near the malleolus, which had not given rise to pain, and was overlooked during life. Ulcero-endocarditis is fortunately a rare disease. It forms one of those hidden rocks in medicine which the most skilled and experienced pilot in diagnosis is likely to run against. It is seldom a primary disease in childhood, but is usually secondary to rheumatism, suppurative disease of the bones or joints, diphtheria, and the infectious diseases. A physical examination of the heart will frequently, but not always, detect an endocardial murmur.

Even in subacute gastritis I have more than once observed the recurrence of chills, exhibiting apparently a periodic type.

The following case in private practice offers a pregnant example: X., æt. fourteen years, of a mobile nervous temperament, was taken ill on June 6 with a chill, malaise, fever, and pain in various parts of the body, but most pronounced across the front of the chest. The tongue was coated and the bowels were loose. The rectal temperature registered 104° and the pulse was 120. A careful examination of the chest detected

nothing abnormal. There was no enlargement of the spleen. On the following day he was quite free from fever and felt well, excepting that his appetite was poor and he was rather weak. On June 8—that is, two days later—he had another marked chill, and when I saw him, an hour afterwards, the rectal temperature was  $103^{\circ}$ ; the pulse 96. I again made a careful examination, but with negative results, save that pressure over the epigastrium elicited pain. *The spleen was decidedly not enlarged.* I ordered the continuance of the light diet which had been neglected as soon as he felt better, and I purposely refrained from giving any medicines. On the day following the temperature was  $100^{\circ}$ , and in a couple of days the patient was restored to his usual health. He has been under my constant observation ever since then, and he has remained perfectly well.

There has been no recurrence of the chills nor any symptom pointing to paludism. Comment is unnecessary.

There is an affection not observed, however, as far as I know, in early life that presents all the characters of intermittent fever, and is not due to malarial poisoning. I mention it here for two reasons: first, to show how conditions other than paludism may produce a train of symptoms which cannot be distinguished from those produced by the malarial poison; and, second, because I have good reasons for believing that the affection is not generally known. I have reference to the “*fièvre intermittente hépatique*,” first described by Charcot,\* and admitted by all the leading authorities on diseases of the liver. Two forms are described: one occurring in patients with latent malaria, and the entrance of a gall-stone in the common bile-duct calls forth chills; and the other occurring in patients entirely free from any malarial taint.

*Convulsions.*—In children it is not uncommon to have a malarial chill replaced by a convulsion, which may be repeated as many as three, four, six, and even eight times within a few hours. In one of my patients, a little boy nineteen months old, who had distinct chills, these were replaced, on one occasion, by eight convulsions in the course of a couple of hours.

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\* “*Leçons sur les Maladies du Foie et des Reins.*” Paris, 1877.



At one time the patient may have a chill or that which has already been described as taking the place of it; at another time it may have a distinct convulsion; or again, it may have a chill which in a short time passes into a general convulsive seizure. Still further, there may not be any chills at all, but only attacks of convulsions. It would extend this paper to an undue length if I were to discuss the various affections in childhood that may be attended with convulsions. But there is one disease in particular which renders its subjects extremely prone to this disturbance of the nervous system,—I mean rickets.

The close association between rickets and convulsions is generally well known; but that which is not so well known is that the milder forms are just as likely as the severer forms to render the little patient subject to eclampsia. What I understand by the milder form is when the disease manifests itself only by delayed or premature dentition, by some sweating about the head, a tendency to kick off the bed-covering, and prominence of the superficial veins of the forehead and temples. In addition to the foregoing, there may be constipation or diarrhœa alternating with constipation. The case that I presented at the New York Academy of Medicine, March 14, 1889,\* may have been said to have belonged to this class, for the nervous disturbances were severe in the extreme.

The baby had suffered for six weeks with attacks of laryngismus stridulus and severe eclamptic attacks. For days the convulsions recurred as often as six times a day, some of which were extremely protracted, one lasting over two hours. But the child made a complete recovery by the treatment being directed to the rickets. In addition, bromide of potassium was given. Quinine or arsenic was not administered. What makes these cases so difficult to differentiate from malaria is the circumstance that the spleen may be considerably swollen, as it was in the case just referred to.

*The febrile stage.*—The fever is the most constant and prominent act in the three-act drama of acute malaria. Lieber-

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\* *New York Medical Journal*, June 8, 1889.



meister\* says, "The febrile access is distinguished from the fever attending most other diseases by its violence, on the one hand, and its rapid evolution on the other." The fever attains its maximum rapidly, at which point it remains for some hours, but the descent of the temperature-curve is gradual. I have seen it reach as high as  $105^{\circ}$  and  $106^{\circ}$  in cases that were of a benign type. In fact, none of the cases that form the basis of this paper could be considered as belonging to the severe or pernicious form. Such sudden high elevation of temperature may be met with at the onset of a simple attack of indigestion or of pneumonia and sometimes of scarlatina. Dr. Cheadle has reported a couple of cases in which the febrile stage was attended with a rash not unlike that of scarlatina. But in making a differential diagnosis in such cases it must be remembered that the scarlatinal rash does not appear until twenty-four hours have elapsed after the onset of the fever. The fauces in these cases may be red, but the redness has not that peculiar punctiform appearance which is so common in scarlatina; and, moreover, the redness in the fauces is less generally diffused. Then again, the fever of malaria is followed by a period of apyrexia more or less complete.

In central pneumonia, where the physical signs do not develop for two or three days, we exclude malaria by the absence of intermittens in the fever. But as the spleen may be considerably swollen in this disease, as will be shown later on, we have often to wait a few days before we are enabled to make our diagnosis.

*Sweating stage.*—The sweating stage in children is usually imperfect both as to degree and duration. It may be so slight as to pass unnoticed by the child as well as by the mother. At times, however, it may be quite profuse. Occasionally the mother will say that the child gets feverish sweats, then "dries up into fever," and again sweats. It may go through two or three such phases during a single paroxysm.

*Swelling of the spleen.*—The spleen enlarges more rapidly and to a greater degree than in adults, owing to the elasticity

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\* Liebermeister, "Infectious Diseases." Part I. Translated by Dr. Hurd Davis, 1888.

of its capsule in early life. Its enlargement is more important as a diagnostic element on account of the uncertainty and imperfection of the cold and sweating stages. Moreover, it may be accidental only, if the physician gets an opportunity to substantiate with the thermometer the mother's statement that the child has attacks of fever. It is also more important from the circumstance that in early life, no matter how small the dose of poison, it is always sufficient to produce marked congestion and consequent enlargement of the spleen. It is true that at first the organ decreases in volume when the paroxysm is over almost as rapidly as it increases, but after the second or third paroxysm it remains permanently swollen. Hence it may be that, if the child is examined in the intervals of the first two or three paroxysms, no increase of size will be noticed. It is then only in such exigencies as these that a diagnosis of malaria in childhood is justifiable in absence of splenic enlargement. The expression of this seemingly well-known fact might appear superfluous were it not that there is a tendency of late, in high quarters, to cast this sign into the background (Holt, Forchheimer). But the enlarged organ has to be sought for by percussion, and not by palpation, as in adult life, for it may reach considerable dimensions without it projecting beyond the margin of the ribs. The splenic tumor pushes its way upward and backward, because it is usually prevented from descending towards the pelvic cavity by the costo-colic ligament, which, in early life, is very rigid.\* I have time and again found the splenic dulness measure, vertically, four inches and more, and yet its lower margin did not reach beyond the eleventh rib. Even when the swollen spleen descends below the margin of the ribs it cannot always be felt as in the adult, owing to the soft consistency of the organ, which has aptly been compared to a sponge, the interstices of which are filled with blood.

To map out an enlarged spleen in a child requires some patience and a considerable degree of practice. I make this statement advisedly, for I have frequently seen skilful phy-

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\* Dr. George McClellan, Keating's "Cyclopædia of the Diseases of Children," vol. i. p. 37.



sicians accustomed to the examining of children make the greatest blunders when they came to examine the spleen. This fact must be my excuse for treating at some length this apparently simple matter. The child, perfectly nude or dressed only in its chemise, should be placed on its mother's lap, or, what is better still, on a table or hard level surface, on which a blanket is laid. It should be placed almost on its right side,—that is, in a position midway between the supine and side, with its left arm—held by the mother or an assistant—over its head. It should be seen to that the child does not arch its back, for in that position the spleen is displaced from the side of the chest. The percussion should be begun high up near the axilla and continued downward in a space bounded by the two axillary lines. As soon as a point is reached at which the note becomes dull, or a greater resistance is offered to the finger, a mark should be made with a pencil. This may be taken as the upper border of the spleen. The percussion should be continued lightly until the tympanitic note of the intestines is elicited. In percussing it is very important that not too much force be used in striking the interposing finger, for if this be done the tympanitic note of the stomach and intestines will be brought out through the overlying spleen. The careful physician need not be told that when abnormal dulness in the region just outlined is obtained, the posterior aspect of the chest should always be examined for pulmonary consolidation, or for what is more likely to give a dull note in that area,—pleuritic effusion. I recall an instance when, in the hurry of dispensary practice, after placing the child in the above position, and obtaining a dull note from the fifth rib downward, the diagnosis of an enlarged spleen was about to be made. The diagnosis of malaria would certainly have been entered on the books, for the symptoms pointed to this affection, did not the axiom, which one soon learns for himself in treating children,—“always examine the chest, no matter what the symptoms may be,”—prick my conscience and urge me to follow my usual routine of examining the chest. I found that the dull note, which I took to be the evidence of an enlarged spleen, was caused by a fairly copious purulent effusion into the pleural sac.

There is another error which one may readily fall into, if he does not bear in mind the fact that the lower border of the spleen is in close contact with the left flexure of the colon (Luschka). Hence an accumulation of feces would give an increase of dulness in the splenic area. I always suspect this when the apparently enlarged spleen does not reach above the upper border of the ninth rib.

But, unfortunately, enlargement of the spleen is not a pathognomonic sign of malaria. It fell to the lot of that able and acute clinician, Friedreich,\* to point out that all acute infectious diseases are attended with marked swelling of the spleen. But of these only two,—typhoid fever and acute infectious pneumonia,—from this circumstance, are likely to cause the diagnostician any difficulty. According to this observer, even the milder forms of typhoid are attended with marked enlargement of the spleen,—an observation which I can fully corroborate in the typhoid of the young. The splenic tumor, therefore, bears no ratio to the severity of the disease. On the contrary, it may reach larger dimensions in the mild than in the graver variety. The enlargement takes place early in the disease. It may already be considerable on the second or third day. Indeed, Friedreich† mentions a case in which he noted a large splenic tumor in the initial stage before the thermometer registered any elevation of temperature. The tumor persists after the subsidence of the fever, and it is only after convalescence has been fully established that the organ regains its natural size.

The acute infectious pneumonia of this author is distinguished from the ordinary croupous variety by the local process, which at first may be confined to a small portion of the lung, spreading gradually from day to day, until the whole lung is affected. The fever continues for ten, twelve, and fourteen days. The termination is not by crisis but by lysis, which may spread over several days. Already during the first few days the spleen is markedly swollen, but the splenic tumor differs from that of typhoid by its rapid disappearance on the cessation of the fever.

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\* Volkmann's *Klin. Vorträge*, No. 75.

† Ibid.



Before leaving this subject, let me draw your attention to a recent paper by Dr. Fichtner,\* in which he describes six cases of sudden onset of fever of three, four, and five days' duration that were attended at the outset with marked enlargement of the spleen. One of the cases occurred in a child three years old. An exclusion was made of typhoid fever, but nothing was said about intermittent fever. An examination of the blood was made in one case only. The result was negative. The author claims to have described a new disease, and this claim receives support from Professor Hoffmann, who, in an appended note to the article, states that he witnessed an epidemic outbreak of what he terms *Fichtner's disease* in several members of the same family. But before adding another disease to our already overburdened nosology, it would seem to me that Fichtner should have presented more data, and should have given good reasons for excluding malaria or other infectious diseases.

*Hæmatozoa in the blood.*—The writings of Laveran,† Marchiafava and Celli,‡ Osler,§ Councilman,|| Shattuck,¶ James,\*\* and others have made every one familiar with the micro-organisms that occur in the blood of patients suffering from malarial poisoning, and it is only necessary for me to treat of them from a diagnostic point of view. But first a few practical hints about the method of obtaining the requisite drop of blood from the finger-pad of a child. So as not to frighten the little one, it is advisable to keep him in ignorance as to what you are going to do, and pretend you are playing with him by tying a soft cord around the last phalanx, in order to produce the necessary congestion in the finger-pad. The pricking should be quickly and deftly done with a sharp-pointed needle, or with—what is better still—a sharp-pointed æsthesiometer,—a suggestion for which I am indebted to Dr.

\* *Deutsch. Archiv f. Klin. Med.*, Bd. xliv., Heft iv.

† "Traité des Fièvres Palustres," Paris, 1884.

‡ "Fortschritte der Medizin," Nos. 14 and 20, 1885.

§ *Brit. Med. Jour.*, March 12, 1887.

|| *Trans. American Physicians*, vol. i., 1886.

¶ *Boston Med. and Surgical Journal*, 1888, p. 450.

\*\* *Med. Record*, January 25, 1888.

James. Let me here, also, express my thanks to this gentleman for his courtesy in examining the blood of some of my cases, and for demonstrating to me the micro-organisms obtained in some of his cases in adult life.

The diagnostic importance of the hæmatozoa or plasmodium malarie is still a matter of doubt, although the weight of evidence is decidedly in favor of their being of pathognomonic value. In a recent note from my highly-esteemed friend and former teacher, Dr. Osler, it is stated "the evidence is accumulating to show the constancy of the forms and the extreme diagnostic value of Laveran's work."

Still, it must be remembered that micro-organisms resembling those occurring in malaria have been found by Rosenstein in the blood of typhoid-fever patients, by Dujardin-Beaumetz in healthy blood when the evaporation of the serum was for a time hindered, by Hoffmann in pernicious anæmia, and by Pfeiffer in scarlet fever, mumps, and vaccination. James\* examined the blood of seventy-six patients suffering from a variety of diseases other than malaria, but including those just mentioned. He states that, in a number of instances, he found micro-organisms which might be mistaken by an inexperienced observer for those met with in malaria, but that any one acquainted with the latter would at once recognize the difference in appearance, which, he says, is marked. So much seems certain that, in order to detect the true forms, one must possess considerable skill and acquaintance with that kind of work. It appears that the hæmatozoa are present only in cases of rather a severe type, or during the paroxysm in less grave forms. Osler has, however, found them in five cases of chronic malaria which did not appear to be very grave. They rapidly disappear on the administration of quinine. Even when present, they are not easily detected, as their number is scanty, and several slides may have to be examined before a single plasmodium is found. I searched for them in fifteen cases presenting unmistakable evidences of acute malarial poisoning. In not a single instance did I succeed in discovering any. A few of these cases were examined

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\* *Med. Record*, January 25, 1888.



by Dr. James, but also with negative results. They may, nevertheless, have been present, for it was seldom that a child would allow his finger to be pricked a second time. Hence, as a rule, one specimen only was examined. The likelihood of having to obtain several specimens before meeting with success is a great drawback to carrying out the examination in children.

*The therapeutic test.*—We are now in a position to discuss the value of quinine as a means of differential diagnosis. Every physician will recall cases in which, after exercising the greatest care and thoroughness in the examination and observation of his patient, he will still be in reasonable doubt as to the nature of the disease before him. In such cases—which are, after all, rare in the practice of the careful and scientific physician—the administration of quinine is justifiable as a means of settling the diagnosis. It has its undoubted value, when properly applied, after we have exhausted all other resources and are still in the dark. But, unfortunately, by the majority of physicians the steps of forming a diagnosis of malaria are taken in the opposite direction. Does the child suffer from chills, lassitude, malaise, headache, etc.,—symptoms common to malaria and a host of other affections,—quinine is indiscriminately given. If the symptoms do not readily yield,—and they do not sometimes, even when due to malarial poisoning, especially in the chronic form,—malaria is excluded, often unjustly. It is then, perhaps, that a thorough examination is made, or the physician goes on groping in the dark trying a variety of remedies in succession, among which anthelmintics figure prominently.

The diseases, in my experience, most likely to be mistaken for acute malaria are acute gastritis and typhoid fever. We have already seen how a mild attack of acute gastritis in a nervous youth may be attended with periodic chills. But in this disease the spleen is not found enlarged. If we adhere to the idea that malaria in childhood is always, with but very few exceptions, attended with swelling of the spleen, we cannot fall into the error of mistaking acute gastritis for malaria. As an illustration of this let me narrate, somewhat at length, the following case :

J. W., æt. three years, was brought to the clinic July 15, 1889, by his mother, who gave the following story: He had always been strong and healthy until four weeks before, when he began to suffer with fever and anorexia. During the first week of illness he had daily three febrile attacks: one in the forenoon, one late in the afternoon, and one at night, each of which was followed by sweating. After that the febrile attacks occurred only every other night. On the day following the febrile night the child would be peevish and out of sorts, but on the second day he would be quite lively and seem fairly well. For the first two weeks he was treated for malaria by a well-known pediatrician, and was given quinine in full doses regularly. But as the child, in spite of this, continued growing worse, the mother became discouraged and left off treatment. After the lapse of two weeks more, and as the child seemed to be getting no better, she decided to bring him to the clinic. At the time of the first visit it was noted, "The child, though fairly healthy looking in the face, shows marked emaciation of the trunk and limbs. The tongue has a peculiar appearance. Running along the centre and occupying about one-third of the width of the dorsal surface is an elevated ridge of a grayish-yellow fur; the remainder of the dorsum is smooth and unduly red. The bowels are constipated, and the abdomen is distended and gives a tympanitic note all over. *There is no enlargement of the spleen.* No fulness in the left iliac region. The inguinal glands are moderately enlarged. The rectal temperature 102.3°. The lungs and heart are normal. An examination of the blood with  $\frac{1}{12}$  oil immersion lens gives negative results." He was given four grains of calomel and soda every second night, and a mixture of rhubarb and soda t. i. d. Liquid diet was ordered. Two days later the following note was made: "Child very much improved; abdomen less tympanitic; tongue cleaning; rectal temperature 99°. July 22. 'Quite well in every respect. He has had no fever since he began treatment.' The inguinal glands still seem larger than normal." He continued in attendance regularly every two days, so as to be kept under observation, until August 26. He had remained perfectly well and had gained flesh. The glands in the groin could then scarcely



be felt. The temperature was taken at each visit, and was never found to be above 99° in the rectum.

The case was instructive to me in several ways. The emaciation had been so great and the illness apparently so grave—although the little fellow walked about—that at first I suspected tuberculosis of some structure, probably of the peritoneum. I at once excluded malaria from the circumstance that the spleen was of normal size. Typhoid fever was excluded for the same reason. Besides, typhoid fever of four weeks' duration, even if mild, is attended with more physical prostration. Dr. A. Seibert,\* in a suggestive article on grave acute gastritis in early childhood, gives the histories of three cases, one of which resembled typhoid fever and another intermittent fever; but the author justly excluded the latter in absence of splenic enlargement. By the majority of physicians vomiting is looked upon as a prominent symptom of gastritis in early life, and as this symptom, in fact, is more often absent than present, the affection is frequently overlooked. Instead of gastritis the diagnosis of "remittent fever," "malaria," and "bilious fever" is not uncommonly made.

In the differential diagnosis of typhoid we receive no assistance from the condition of the spleen, inasmuch as the organ swells considerably in that disease, as has been already fully dwelt upon. Pronounced cases, of course, offer no difficulties, but, in my experience, these are the exception. One meets with cases of "walking typhoid" just as frequently among children as among adults. Scarcely a week passes that I do not see one or two such cases at the Vanderbilt Clinic. Some authors lay great stress on the negative value of herpes labialis as a diagnostic symptom. Liebermeister† and others would exclude typhoid fever in the presence of herpes of the lips or of the nose. On the other hand, herpes of these parts are rather common in acute malaria. Prodromata, although not as frequent an occurrence in the typhoid of children as in that of a more advanced life, do sometimes occur. Of these epistaxis and headache possess the most diagnostic value. In typhoid the temperature-curve will be different. It will show

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\* *Jahrbuch für Kinderheilkunde*, 1887.

† *Loc. cit.*

that the exacerbations always occur in the evening, while in malaria they may occur in the forenoon. Further, in typhoid the elevation of temperature is constant; in malaria, excepting in the remittent type, which is seen only in very malarious regions, the febrile attacks are separated by intervals of apyrexia of at least several hours' duration. The appearance of a roseola rash in typhoid is of pathognomonic value. But for this we have to wait twelve days after the onset of the fever, although Jürgensen\* states that in the mild cases of typhoid in adults the rash occurs as early as on the fifth day. It is, however, a more constant sign in the typhoid of early life than in that of advanced life. In children the rash is more likely to make its appearance first on the lower part of the back than on the lower part of the front of the chest and abdomen, as in adults. In the majority of cases of typhoid in children the tongue will show the characteristic appearance, the dorsum being coated heavily with a grayish-white fur, while the edges and tip are of a bright red color. Lastly, if we are still in doubt, an examination of the blood should be made. Of course, it is in doubtful cases like these that quinine finds some value as a diagnostic test.

As an illustration of the difficulties sometimes encountered in forming a diagnosis allow me to relate briefly the following case:

M. A., a little girl, twelve years old, came alone to the clinic on August 7, and stated that her health began to fail about two months before, and that for the last six weeks she had had a daily chill followed by fever, but not by sweating. That was all I could ascertain from her. I found her quite anæmic, with a dark yellowish discoloration of the skin. The tongue was coated with a heavy white fur, and the tip and edges were red. She said that her appetite was *nil*, and that for some days she had vomited everything she took, and that her bowels were rather loose. A careful examination revealed dry rhonchi all over the chest and considerable enlargement of the spleen (four inches vertically). Rectal temperature 102°; pulse 120, soft and small. She was told to go to bed and was ordered a milk diet and a mixture of bismuth and

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\* Volkmann's *Klin. Vorträge*, No. 61.

hydrocyanic acid. August 9 she called again. Vomiting had ceased, the tongue was cleaning, and the bowels were not so loose. She had no chills; the size of the spleen was the same; the temperature was  $103^{\circ}$ . She was told to continue with the same dietetic regimen, and was given pill quinine five grains t. i. d. August 12: No change; splenic enlargement persists; temperature  $102^{\circ}$ ; pulse 120; a few suspicious spots on the lower part of the chest. She was now given antipyrin as an antipyretic, and was ordered resorcin five grains t. i. d. She was instructed to remain at home and go to bed. My assistant, Dr. Schelpert, kindly undertook to watch the case for me. The temperature ranged from  $101^{\circ}$  to  $103^{\circ}$  until the 19th, when it fell to the normal. She called at the clinic on the 23d, and seemed quite convalescent. She made no complaint; the tongue was clean, appetite was good, and the temperature was normal. The spleen was of normal size. On the 26th she called again, saying that on that morning she had had a chill, and that she felt quite ill since then. I found the rectal temperature  $105^{\circ}$ , the pulse 120, and the spleen moderately enlarged. She was put upon the former treatment, and in seven days convalescence set in again,—permanently this time.

The case was undoubtedly one of typhoid, which probably had been running for three or four weeks before coming to the clinic. The chills, from which the patient stated that she had suffered daily, were doubtless the chilly sensations which patients frequently experience when they walk about with an elevated temperature. They ceased as soon as the patient was put to bed and before any quinine had been administered, which medicine had no effect whatever upon the course of the disease.

Any doubt that might have been entertained as to the nature of the illness was entirely dissipated when I made a visit to the house during her relapse, and found that the mother was suffering from unmistakable typhoid in the fourth week, from which she has since died.\*

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\* Since the above was written, three more members of the family have had typhoid fever.



*Chronic malaria.*—Under this heading I would describe the milder forms of paludal poisoning, which formed at least sixty per cent. of my cases. There may be chills and fever at the outset, which the mother has usually forgotten, unless she is questioned about them, or, what is more frequently the case, the affection is insidious from the beginning. The mother will tell you that the child has been ailing for some time, but she cannot say just when it began to show signs of ill health. I would make a distinction between this form and that of malarial cachexia,—a term which I would apply to the severer forms of protracted paludal poisoning, that met with in very malarious regions. I have had little experience with the latter, and will leave it out of consideration in this paper.

Chronic malaria manifests itself by a variety of symptoms, which may or may not show periodicity. Prominent among these are lassitude, drowsiness, a lack of energy, tiring on slight exertion, headache, dizziness, wandering pains in various parts of the body, chilly sensations, neuralgia of the intercostal nerves, restlessness at night, anorexia, vomiting, constipation, rarely diarrhoea, bloody diarrhoea, emaciation, a dirty brownish-yellow tint of the skin, anemia, syncopal attacks, urticaria, night-sweats, asthmatic attacks, pain over the region of the spleen.

None of the enumerated symptoms, taken alone or conjointly, justify a diagnosis of malaria. They are met with in a number of other chronic diseases, but notably in chronic dyspepsia and what, for want of a better term, we will call debility, congenital or acquired. Here even more than in the acute form enlargement of the spleen is a *sine quâ non* in the diagnosis of malaria.

Some of the foregoing symptoms deserve special consideration.

*Headache.*—There is nothing characteristic about the pain in the head which would indicate its pathology. It was not a common symptom in my cases. On the other hand, I have met with this symptom much more frequently in chronic dyspepsia and in children who applied themselves too closely to their studies. I have never observed a case of brow ague,

which is so common a feature of chronic malaria in the adult. Eustace Smith\* says that it is never met with.

*Vertigo* is said to be a rare symptom in children, and when it does occur it is considered by many as almost pathognomonic of malaria. It was not present in any of my cases. Bohn only saw it once in four hundred and sixty-five cases. But it was a prominent symptom in two cases of *tænia lata* that came under my notice. I have not infrequently observed it follow slight concussion of the brain, caused by a fall, which the mother had forgotten until questioned about it.

*Bloody diarrhœa.*—I have met with it only once. It occurred every night; the child having from four to six stools, consisting mostly of blood. There was no looseness of the bowels during the day. At times this symptom does not exhibit any periodicity, and is distinguished from dysentery by the absence of pain and tenesmus, and by the absence of any considerable quantity of mucus in the stools. Further, in dysentery the spleen is not appreciably enlarged.

*Vomiting*, as an only symptom, was present in three of my cases, in two of which it occurred periodically, in one daily, and in the other every other day. On the same day that the child with the daily vomiting came under my care at the clinic another child was brought there to me with exactly the same symptom. In the latter case there was no enlargement of the spleen; but on questioning the mother, I learned that the child, some days before, on going down-stairs, had fallen a distance of three or four steps. The vomiting had begun since the fall, and was arrested in a few days by keeping the little one in bed and giving it daily three doses of fifteen grains each of bromide of potassium. Protracted vomiting in early life is not, in my experience, an uncommon symptom following an insignificant fall. In some cases it appears to take on a periodic type, as in the case alluded to.

*A peculiar color of the skin.*—Much diagnostic importance is attached to a pigmentation of the skin, showing itself in a peculiar "bistre" tint. It probably possesses great value in the severer forms of malarial cachexia, but it is not a charac-

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\* Loc. cit., p. 149.

teristic sign in chronic malaria. In none of my cases was it at all striking. In several of them the skin presented that dirty sallow appearance which is common to all affections attended with malnutrition, and in other cases the skin was of the normal hue.

*Attacks of syncope.*—I have not been able to find any mention of this symptom in the literature of malaria in early life that I have read. It occurred in two of my cases. In one it preceded the onset of the chills; in the other, a little girl four years of age had had no chills, but had fainting spells every day at 11 A.M. The mother stated that the child grew feverish after the syncopal attacks, and that she complained of feeling chilly at night. It would probably have been more proper to have described this symptom under acute malaria as one of the phenomena that may replace a chill in early life.

My friend, Dr. B. Sachs, tells me of a case that he had in private practice, in which a child, four months old, had for five or six successive days several fainting spells, or rather attacks of semi-collapse, in which the child apparently lost consciousness. The eyes rolled up and inward, the body became covered with a clammy perspiration, and the pulse was thread-like. The temperature, taken several times a day, showed moderate elevation ( $103^{\circ}$ ) at times, and at other times it was normal. The spleen was but moderately enlarged. The child was on the breast, and there was no evidence of gastric or intestinal disturbance. A diagnosis of malaria was made by exclusion. Quinine was administered, and the baby made a rapid and satisfactory recovery.

*Urticaria* is said by many to be a common symptom of chronic malaria in the child as well as in the adult. Bohn met with it only occasionally, and then mostly in the acute variety during the paroxysm. I have only twice seen chronic urticaria accompanied by enlargement of the spleen. But in children, chronic urticaria, not of malarial origin, is often cured by full doses of quinine. This circumstance doubtless accounts for the prevalent opinion that the affection is frequently caused by paludal poisoning. It forms a good illustration also of the likely errors in diagnosis that may be committed when much reliance is placed upon the therapeutic test.



*Night-sweats.*—This is another symptom the mention of which I have not been able to find in literature. It was present in two of my cases, one of which was quite instructive to me. The little girl, six and a half years of age, had always been delicate and had suffered from rickets in infancy, the evidence of which she showed in a pigeon-shaped breast. She had diphtheria eight months before and scarlet fever two months later. There was a loud systolic murmur at the apex, but no increase of cardiac dulness. The lungs were sound and the urine normal. No attention was paid to the spleen. The night-sweats were looked upon by me and by others as due to overheated rooms, to too much bed-covering, and to the delicacy of the child's health. Still, it was thought advisable to keep her under observation for future developments. Under improved hygienic surroundings, and a tonic treatment of several months, she grew considerably stronger and gained in flesh. But the night-sweats persisted, although they became less severe and less constant. About this time I began to make it a part of my routine at the clinic to carefully map out the limits of the spleen in every case. To my surprise, I found that her spleen was considerably enlarged (three inches vertically). She was now put upon a course of quinine and arsenic, and in the course of a few weeks the night-sweats entirely ceased. It is necessary to add that other chronic conditions which might give rise to a splenic tumor were excluded. The heart trouble could not possibly be credited with it, as circulatory disturbances were not present.

The chronic affections in childhood attended with marked enlargement of the spleen are leucocythæmia, lymphadenoma (Hodgkin's disease), and amyloid degenerations of the internal organs. In the differential diagnosis of these affections it must be borne in mind that leucocythæmia and amyloid degeneration may be the sequelæ of long-continued malarial poisoning. They each, however, possess characteristics of their own, and are easily recognized.

*Treatment.*—My paper has already reached such a length that I can only say a few words on this subject. I will make the confession at the outset that I have not found the cure of malaria—especially the chronic form, in early life—the easy

matter that some observers would lead us to suppose. Of course, quinine forms our sheet-anchor. I am in the habit of prescribing it in solution with aromatic sulphuric acid and syrup of lemon. This mixture is ordered to be given in sugar-water. Children seem, in most instances, to take it in this way readily. When it causes vomiting, I add aqua lauro-cerasi. I prefer giving the quinine in two or three large daily doses (five grains to a child five years old) until all acute symptoms subside. After this, a single large dose is given every third or fourth day for a couple of weeks. In the mean time, the remedy is given in smaller doses combined with liquor arsenici chloridi and acidum muriaticum dilutum three times a day for several weeks. In private practice I find that the tablets of chocolate of quinine, each containing one grain of the tannate, is a very pleasant form of administering the drug. I prefer those manufactured by Hazard, Hazard & Co., of New York, to the imported ones, as the chocolate is fresher, and is not so likely to disagree with the child's stomach. Bohn speaks very highly of the tannate salt in the treatment of children, but says it must be given in double the dose that the sulphate or muriate is given. Children at the breast might have the drug introduced into their system by administering it to the mother; but I have no data on this point. I have found that suppositories of quinine act very well where it is impossible to give the quinine by the mouth. I have never tried inunctions. Hypodermic injections should only be resorted to under the most urgent circumstances from their likelihood of being attended with abscess formations. Children are very prone to relapses; and to prevent these, I have had good results with pure nitric acid\* in doses of from two to five drops well sweetened and diluted. When the patient comes under treatment, unless he is suffering from actual diarrhœa, it is my custom to give a few purgative doses of calomel combined with soda. It has been a very common experience with me to find that, although all the symptoms had vanished under anti-periodic treatment, the enlargement of the spleen would persist. As it is a well-known fact that relapses are more liable

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\* This remedy is recommended by Dr. S. M. Bemiss.

to occur while the spleen remains enlarged, and that the chronic congestion may lead to permanent changes of structure, it behooves us to use every available means to bring the organ back to its normal size. Professor Jacobi, in his clinical lectures, recommends for this the administration of ergot. The drug has proved very efficacious in my hands. I gave usually the fluid extract in doses of ten to fifteen minims to a child five years old. It seemed to me that the ergot had no effect upon the malarial poison itself. A few cases of tumor of the spleen resisted even this treatment, and then I resorted to inunctions of ammoniated mercurial ointment over the region of the tumor, and gave strychnine internally. If it is thought advisable to give salines, it will be well to bear in mind an old observation of Glax and Kirch, and which has recently been substantiated by Pollatschek.\* These observers noticed that patients undergoing a course of treatment at Carlsbad were prone to have a return of intermittent fever if they had ever suffered from it before.

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